

FGD Dust Containment

Overview

A primary by-product of Flue Gas Desulfurization (FGD) or Scrubber is gypsum. Scrubbers are generally used by coal burning power plants, cement plants and other applications which will produce flue gases that are not in compliance to applicable regulations.

Coal burning power plants will produce enormous amounts of gypsum, which in its own right has product value to various industries (wallboard, paving,

bricks and agriculture). However, its economic value is weak because the supply generated far exceeds the demand. Therefore, to maintain the value for the over-abundant commodity, the gypsum is stockpiled and then graded per a set of specifications; in-spec material is shipped directly to buyers, out-of-spec material is sent to a landfill. The cost to provide and maintain a system to handle this scrubber by-product is significant and reduces the marginal market value of sellable gypsum. Therefore, a means to contain and control any environmental impacts of open stockpiling must have great utility and yet be financially feasible and require little or no maintenance.



Challenge

A major Midwest Electric Utility was mandated by regulatory agencies to remediate the airborne dust created from the stockpiled gypsum. The plant's process is to transport the gypsum from the plant to a stockpile area for grading, via conveyor and radial stacker system. The in-spec materials are loaded into barges via conveyor serviced by front end loaders. The out-of-spec material is transported to a temporary landfill via "over the road" and "off-road" trucks.

The open stockpile allowed for the wind to pass over, causing air borne dusting and consequently carrying the gypsum dust away throughout the local community, thus environmental concerns.

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Solution

Varo Engineers, Inc, (VE) was hired to assess the problem and provide an efficient and cost effective solution. VE designed the fence to incorporate the DustTamer™ wind fence product by Dust Solutions, Inc (DSI) as a major component of the dust control system. The DustTamer™ is a fabric material with a specially designed porosity which allows 30% to 50% of the ambient air to breathe through the fabric, helping to equalize the pressure differential from one side of the fabric to the other. A solid, non-porous wall or enclosure will create low pressure zones at the dust source and since air moves from high pressure to low pressure area, it increases the velocities and airborne particulates.



10'-0 high concrete push walls were designed and strategically placed to lessen the possibility of damage to the fence. The wind fence encloses a rectangular area of about 3 acres and reached approximately 40'-0 above grade. The fabric is supplied in one meter wide rolls which are stretched row by row and attached to a framework of "H" piles with the spacing and embedment depth calculated from analysis of geo-tech borings and associated reports.

The concrete push walls are strategically located to keep the gypsum stock pile from contacting the fence and also at the entrance to the enclosure to protect from vehicle and equipment traffic. The openings in the fence were designed to minimize leakage at the feeder conveyor (from the plant) and at the exit conveyor.

Performance

This dust control system has been in place since 2010. After four years of service, the plant continues to be satisfied with the design, delivery, implementation, and final outcome of the system. The fence has required minimal attention and maintenance and as reported by the plant personnel; the design has facilitated the ease in replacing damaged fabric and the push-wall design has been instrumental in protecting the fence from equipment damage.